

## Claims

1. An optical network hub structure comprising:

- a WDM unit arranged in line with a fibre trunk carrying a bi-directional optical network signal to drop/add blocks of wavelengths destined to/originating from the network hub structure and to through connect other blocks of wavelengths, and

- at least one amplifier structure disposed in line on the fibre trunk at each side of the WDM unit, each amplifier structure comprising:

- at least two propagation dependent optical junction elements,

- at least two optical paths optically connected in parallel between the two junction elements, and

- a first amplifier in only one of the optical paths,

whereby a bi-directional, multiplexed optical signal comprising different blocks of wavelengths, each block of wavelengths having a specified propagation direction with respect to the amplifier structure, is, in use, uni-directionally amplified,

whereby at each side of the WDM unit the optical network signal is, in use, uni-directionally amplified.

2. A hub structure as claimed in claim 1, wherein each amplifier structure further comprises a filter element in each of the optical paths, each filter element arranged, in use, to transmit only the blocks of wavelengths having the propagation direction with respect to the amplifier structure intended for transmission in the respective optical path.

3. A hub structure as claimed in claim 1, wherein the filter element in the one optical path in which the amplifier is located is arranged at the input of the amplifier.

4. A hub structure as claimed in claim 1, wherein each amplifier structure further comprises a second amplifier operating in a different wavelength band than the first amplifier and optically connected in parallel with the first amplifier in the one optical path by way of a band splitter and a band coupler, whereby each amplifier structure can be used to uni-directionally amplify the bi-directional, multiplexed signal in different wavelengths bands.

5. A hub structure as claimed in claim 4, wherein two filter elements are provided in the one optical path, one at the input of each of the first and second amplifiers.

6. A hub structure as claimed in claim 1, wherein each optical path further comprises optical isolator means.

7. A hub structure as claimed in claim 2, wherein the filter elements comprise band reflect filters.

5 8. A hub structure as claimed in claim 1, wherein the optical junction element comprises an optical circulator.

9. A hub structure as claimed in claim 8, wherein the optical circulator is a blocking optical circulator.

10 10. A hub structure as claimed in claim 1, wherein the optical junction element comprises a WDM multiplexer/demultiplexer unit.

11. A hub structure as claimed in claim 1, wherein each amplifier structure is arranged in a manner such that the optical network signal is, in use, uni-directionally amplified in a direction towards the network hub structure.

12. An in-line optical amplifier structure, the amplifier structure comprising:

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- at least two propagation dependent optical junction elements,
  - at least two optical paths optically connected in parallel between the two junction elements, and
  - a first amplifier in only one of the optical paths,

20 whereby a bi-directional, multiplexed optical signal comprising different blocks of wavelengths, each block of wavelengths having a specified propagation direction with respect to the amplifier structure, is, in use, uni-directionally amplified.